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GGSIPU physics 2006

1. If M is the mass of the earth and R its rasius,the ratio of the gravitational acceleration and the gravitational constant is :

(a) $\frac{R^2}{M}$ **(b)** $\frac{M}{R^2}$

(c) MR^2 **(d)** $\frac{M}{R}$

2. A student unable to answer a question on Newton's laws of motion attempts to pull himself up by tugging on the his hair.He will not succeed :

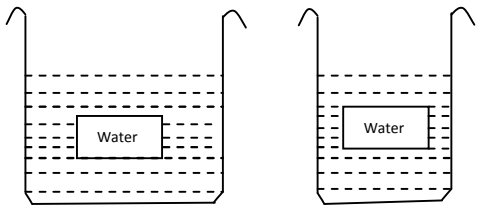
(a) as the force exerted is small

(b) the frictional force while gripping,is small

(c) Newton's law of inertia is not applicable to living beings

(d) as the force applied is internal to the system

3. From the adjacent figure,the correct observation is :



(a) the pressure on the buttom of tank A is greater than at the bottom of B
(b) the pressure on the buttom of the tank A is smaller than at the buttom of B
(c) the pressure depends on the shape of the container
(d) the pressure on the buttom of A and B is the same

4. Which one of the following is not a unit of Young's modules ?

(a) NM^{-1} **(b)** NM^{-2}

(c) dyne cm^{-2} **(d) mega pascal**

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5. A piece of blue glass heated to a high temperature and a piece of red grass at room temperature,are taken inside a dimly lit room,then :

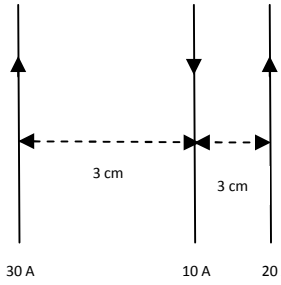
(a) the blue piece will look blue and red will look as usual

(b) red looks brighter red and blue looks ordinary blue

(c) blue shines like brighter red compared to the red piece

(d) both the piece will look equally red

6. Three long,straight parallel wires ,carrying current,are arranged as shown in figure .The force experienced by a 25 cm length of wire C is :



(a) 10^{-3} N (b) 2.5×10^{-3}

(c) zero (d) 1.5×10^{3} N

7. A 5.0 amp current is setup in an external circuit by a 6.0 volt storage battery for 6.0 minutes.The chemical energy of the battery is reduced by :

(a) 1.08×10^{4} J (b) 1.08×10^{4} J

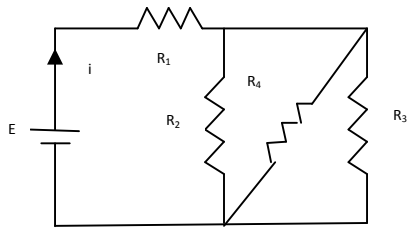
(c) 1.8×10^{4} J (d) 1.08×10^{4} J

8. The current in a simple series circuit is 5.0 A.When an additional resistance of 2.0 t is inseted,the current drops to 4.0 A.The original resistance of the circuit,in ohms was :

(a) 1.25 (b) 8

(c) 10 (d) 20

9. In the circuit given E = 6.0 V,R_1 = 100 t , R_4 =75 t . The equivalent resistance of the circuit, in ohms is :



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(a) 11.875 (b) 26.31

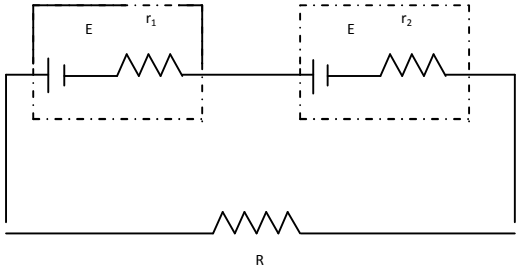
(c) 118.75 (d) none of these

10. Two resistances are connected in two gaps of a metre bridge.The balance point is 20 cm from the zero end.A resistance of 15 t is connected in series with the smaller of the two.The null point shifts to 40 cm.The value of the smaller resistance in ohms is :

(a) 3 (b) 6

(c) 9 (d) 12

11. If the potential different across the internal resistance r_1 is equal to the emf E of the battery,then :



(a) $R = r_1 + r_2$

(b) $R = \frac{r_1}{r_2}$

(c) $R = r_1 - r_2$

(d) $R = \frac{r_2}{r_1}$

12. By using only two resistance coils-singly,in series or in parallel one should be able to obtain resistancs of 3,4,12 and 16 t .The separate resistance of the coil are :

(a) 3 and 4 (b) 4 and 12

(c) 12 and 16 (d) 16 and 3

13. The electrons in the beam of a television tube move horizontally from south to north.The vertical component of the earth's magnetic field points down.The electron is deflected towards :

(a) west (b) no deflection

(c) east (d) north to south

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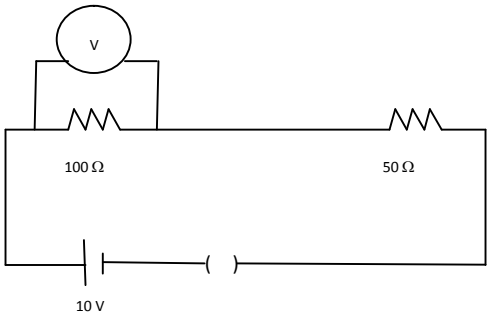
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14. A tangent galvanometer has a reduction factor of 1 A and it is placed with the plane of its coil perpendicular to the magnetic meridian.The deflection produced when a current of 1 A is passed through it is :

(a) 60^0 (b) 45^0

(c) 30^0 (d) none of these

15. In this given circuit,the voltmeter records 5 V.The resistance of the voltmeter in ohms is :



(a) 200
(b) 100
(c) 10
(d) 50

16. The wavelength of the radiation emitted by a body depends upon :

(a) the nature of the surface

(b) the area of the surface

(c) the temperature of the surface

(d) all the above factors

17. which mirror is to be used to obtain a parallel beam of light from a small lamp ?

(a) plane mirror

(b) Convex mirror

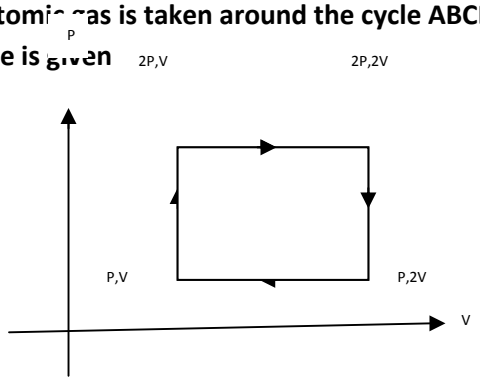
(c) Concave mirror

(d) Any one of the above

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18. An ideal monoatomic gas is taken around the cycle ABCDA as shown in the PV diagram.The work done during the cycle is given



(a) $\frac{1}{2}$PV (b) PV

(c) 2 PV (d) 4 PV

19. Which of the following is a wrong statement ?

(a) D = $\frac{1}{f}$, where f I the focal length and D is called the refractive power of lens

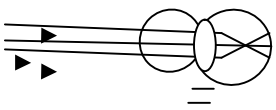
(b) Power is expressed in dioptre when f is in metres

(c) Power is expressed in dioptere and does not depend on the system of unit used to measure f

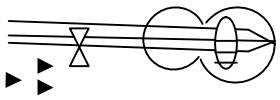
(d) D is positive for convergent lens and negative for divergent lens

20. Identify the wrong description of the below figures

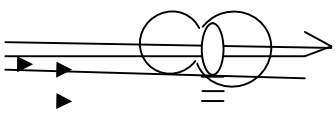
1.



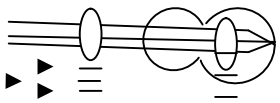
2.



3.



4.



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(a) 1 represents far-sightedness
(b) 2 correction for short sightedness
(c) 3 represents far-sightedness
(d) 4 correction for-sightedness

21. An electric field of 1500 V/m and a magnetic field of 0.40 Wb/m^2 act on moving electron.The minimum uniform speed along a straight line the electron could have is :

(a) 1.6 x 10^{15} m/s (b) 6 x 10^{-16} m/s

(b) 3.75 x 10^3 m/s (d) 3.75 x 10^2 m/s

22. In an ammeter 10% of main current is passing through the galvanometer.If the resistance of the galvanometer is C,then the shunt resistance,in ohms is :

(a) 9G (b) $\frac{G}{9}$

(b) 90 G (d) $\frac{G}{90}$

23. Among the following properties describing diamagnism identify the property that is wrongly stated :

(a) diamagnetic material do not have permanent magnetic moment

(b) diamagnetism is explained in terms of electromagnetic induction

(c) diamagnetic materials have a small positive susceptibility

(d) the magnetic moment of individual electrons neutralize each other

24. The induction coil works on the principle of :

(a) self-induction

(b) mutual induction

(c) Ampere's rule

(d) Fleming's right hand rule

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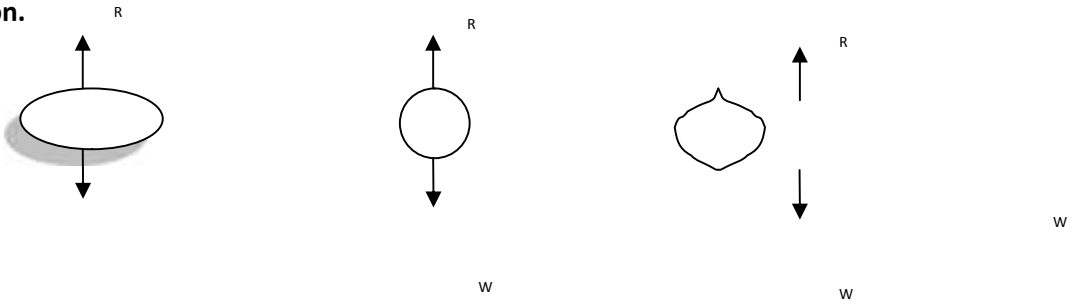
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25. The square root of the product of inductance and capacitance has the dimension of ?

(a) length (b) mass

(b) time (d) no dimension

26. When a body falls in air,the resistance of air depends to a great extant on the shape of the body.3 different shapes are given.Identify the combination of air resistances which truly represents the physical situation.

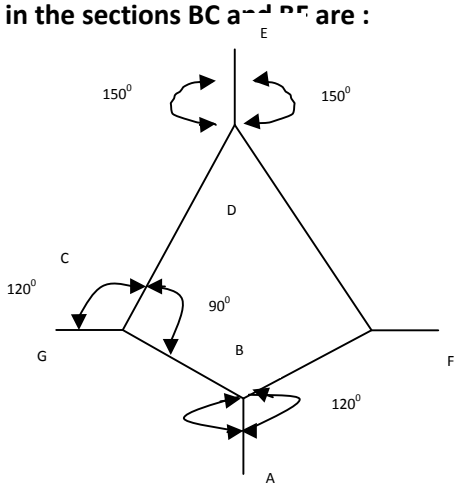


(1) disc 2. Ball 3. Cigar shaped

(The cross-sectional areas are the same).

(a) 1 < 2 < 3
(b) 2 <3 < 1
(c) 3 < 2 < 1
(d) 3 <1 < 2

27. The adjacent figure is the part of a horizontally stretched net.Section AB is stretched with a force of 10 N.The tensions in the sections BC and BF are :



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(a) 10 N, 11 N
(b) 10 N, 6 N
(c) 10 N, 10 N
(d) Cannot be calculated due to insufficient data

28. Out of the following four dimensional quantities, which one qualifies to be called a dimensional constant ?

(a) Acceleration due to gravity

(b) Surface tension of water

(c) Weight of a standard kilogram mass

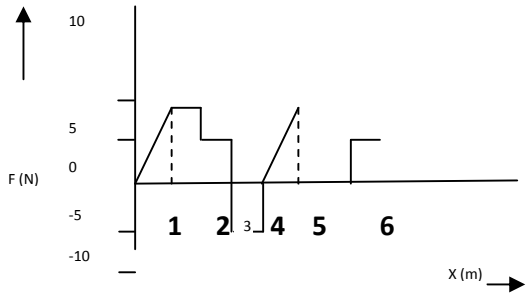
(d) The velocity of light in vaccum

29. The relationship between the force F and position x of a body is as shown in figure.The work done in displacing the body from x = 1 m to x = 5 m will be :

(a) 30 J (b) 15 J

(b) 25 J (d) 20 J

30. From the top of a water of two stones,whose masses are in the ratio 1 : 2 are thrown on straight up with an initial speed u and the second straight down with the same speed u.Then neglecting air resistance :



(a) The havier stone hits the ground with a higher speed
(b) The lighter stone hits the ground with a higher speed
(c) Both the stones have the same speed when they hit the ground

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(d) The speed cannot be determined with the given data

31. Infrared radiation was discovered in 1800 by :

(a) William Wollaston

(b) William Herschel

(c) Wilhelm Roengen

(d) Thomas Young

32. A particle on the through of a wave at any instant will come to the mean position after a time (T = time period) :

(a) T/2 (b) T/4

(c) T (d) 2T

33. The disc of a siren containing 60holes rotates at a constant speed of 360 rpm.The emitted sound is in unison with a tuning fork of frequency :

(a) 10 H_z (b) 360 H_z

(b) 216 H_z (d) 60 H_z

34. The ratio of velocity of sound in hydrogen and oxygen at STP is :

(a) 16 : 1 (b) 8 : 1

(c) 4 : 1 (d) 2 : 1

35. In an experiment with sonometer a turning fork of frequency 256 H_z resonates with a length of 25 cm and another turning fork resonates with a length of 16 cm.Tension of the string remaining constant the frequency of the second turning fork is :

(a) 163.84 H_z (b) 400 H_z

(c) 320 H_z (d) 204.8 H_z

36. The apparent frequency of note is 200 H_z,when a listener is moving with a velocity of 40 ms^{-1} towards a stationary source.When he moves away from the same source with the same speed,the apparent frequency of the same note is 160 H_z.The velocity of sound in air in m/s is :

(a) 340 (b) 330

(c) 360 (d) 320

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37. The wave theory of light,in its original form,was first posulated by :

(a) Issac Newton

(b) Christian Huygens

(c) Thomas Young

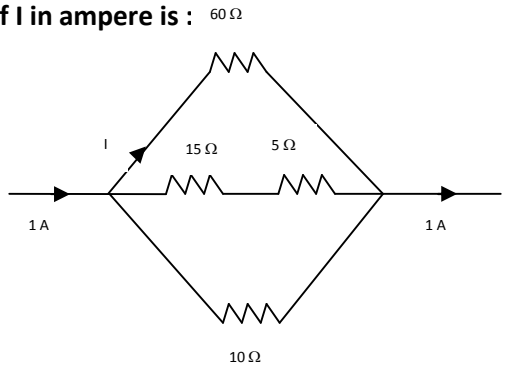
(d) Augustin Jean Fresnel

38. If a liquid does not wet glass,its angle of contact is :

(a) zero (b) acute

(b) obtuse (d) right angle

39. The magnitude of I in ampere is :



(a) 0.1 (b) 0.3

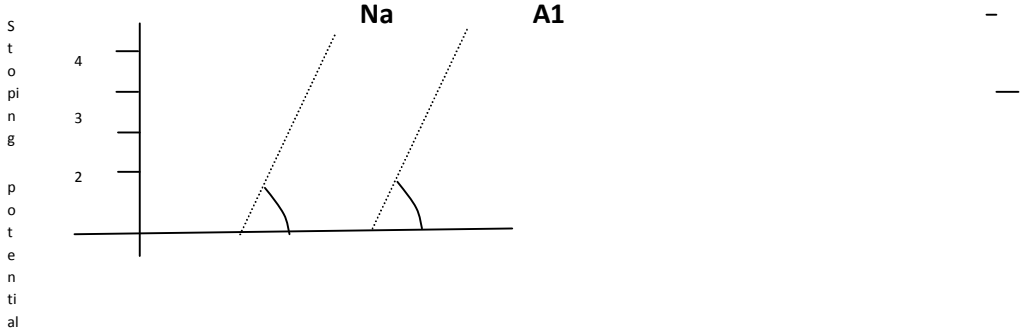
(c) 0.6 (d) none of these

40. Electron of mass m and charhe q is travelling with a speed v along a circular path of radius r at right angles to a uniform magnetic field of intensity B.If the speed of the electron is doubled and the magnetic field is halved the resulting path would have a redius :

(a) 2r (b) 4r

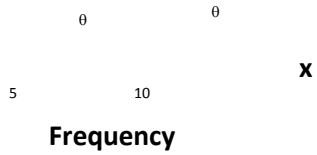
(c) r/4 (d) r/2

41. From the figure describing photoelectric effect we may infer correctly that :



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(a) Na and A1 both have the same threshold frequency
(b) Maximum kinetic energy for both the metals depend linearly on the frequency
(c) The stopping potentials are different for Na and A1 for the same change in frequency
(d) A1 is a better photo sensitive material than Na

42. Tho coherent light beams of intensity I and 4I are superposed.The maximum and minimum possible intensities in the resulting beam are :

(a) 9 I and I (b) 9 I and 3 I

(b) 5 I and I (d) 5 I and 3 I

43. The electron in a hydrogen atom makes a transition from $n=n_1$ to $n=n_2$ stare.The time period of the electron in the initial state (n_1) is eight times that in the final state (n_2).The possible values of n_1 and n_2 are :

(a) $n_1 = 8, n_2 = 1$ (b) $n_1 = 4, n_2 = 2$

(b) $n_1 = 2, n_2 = 4$ (d) $n_1 = 1, n_2 = 8$

44. If the forward voltage in a diode is increased ,the width of the depletion region :

(a) increases (b) decreases

(b) fluctuates (d) no change

45. Two nucleons are at a separation of one farmi.protons have a charge of $+ 1.6 \times 10^{-19}$ C.The net nuclear force between them is F_1,,if both are neutrons,F_2 if both are protons and F_3 if one is proton and the other is neutron.Then :

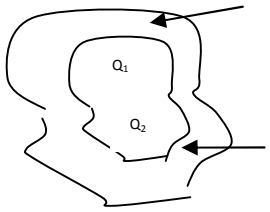
(a) $F_1 = F_2 > F_3$ (b) $F_1 = F_2 = F_3$

(c) $F_1 < F_2 < F_3$ (d) $F_1 > F_2 > F_3$

46. The electric flux for Gaussian surface A that enclose the charged particles in free space is (given $q_1 = -14$ nC, $q_2 = 78.85$ nC, $q_3 = -56$ nC) :

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(a) 10^3 Nm^2C^{-1}
(b) 10^3 $CN^{-1}m^{-2}$
(c) 6.32×10^3 Nm^2C^{-1}
(d) 6.32×10^3 $CN^{-1}m^{-2}$

47. Four metal conductors have different shapes :

(a) a sphere (b) cylinder

(b) pear (d) lightning conductor

48. The potential to which a conductor is raised,depends on :

(a) the amount of charge

(b) geometry and sije of the conductor

(c) both (a) and (b)

(d) only on (a)

49. The work done in carrying in charge q once round a cycle of redius r with a charge Q at the centre is :

(a) $\frac{qQ}{4\pi\varepsilon_0 r}$ (b) $\frac{qQ}{4\pi\varepsilon_0 r^2}$

(c) $\frac{qQ}{4\pi\varepsilon_0 r^2}$ (d) none of these

50. An air filled parallel plate,condenser has a capacity of 2 pF.The separation of the plates Is doubled and the interpace between the plates is filled with wax.If the capacity is increased to 6 pF,the dielectric constant of wax is :

(a) 2 (b) 3 (c) 4 (d) 6

51. The energy that should be added to an electron to reduce its de-Broglie wavelength from 1 nm to 0.5 nm is :

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(a) four times the initial energy

(b) equal to the initial energy

(c) twice the initial energy

(d) thrice the initial energy

52. Mean life of a radioactive sample is 100 s.Then its half life (in minutes)is :

(a) 0.693 (b) 1 (c) 10^{-4} (d) 1.155

53. Consider two nuclei of the same radioactive nuclide.One of the nuclei was created in a supernova explosion 5 billion years ago.The other was created in a nuclear reacter 5 minutes ago.The probability of decay during the next time is :

(a) different for each nuclei

(b) nuclei created in explosion decays first

(c) nuclei created in the reactor decays first

(d) independent of the time of creation

54. Bohar's atom model assumes :

(a) the nucleus is of infinite mass and is it rest

(b) electrons in a quantized orbit will not radiate energy

(c) mass of electron remains constant

(d) all the above condition

55. Identify the property which is not characteristics for a semiconductor ?

(a) At a very low temperatures,it behaves like an insultor

(b) At higher temperatures two types of charge carriers will cause conductivity

(c) The charge carriers are electrons and holes in the valence band at higher temperature

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(d) The semiconductor is electrically naturally

56. Identify the wrong statement in the following,Colomb's law correctly described the electric force that :

(a) binds the electrons of an atom to its nucleus

(b) binds the protons and neutrons in the nucleus of an atom

(c) binds atoms together to form molecules

(d) binds atoms and molecules to form solids

57. A single slit of width d is illuminated by violet light of wavelength 400 nm and the width of the diffraction pattern is measured as y.When half of the slit width is covered illuminated by yellow light of wavelength 600 nm,the width of the diffraction pattern is :

(a) the pattern vanishes and the width is zero

(b) $\frac{y}{3}$

(c) 3y

(d) none of the above

58. At kavalur in India,the astronomers using a telescope whose objective had a diameter of one metre started using telescope of diameter 2.54 m.The resulted in :

(a) the increasing in the resolving power by 2.54 times for the same [a]

(b) the increase in the limiting angle by 2.54 times for the same [a]

(c) decrease in the resolving power

(d) no effect on the limiting angle

59. when unpolarised light beam is incident from air onto glass (n = 1.5) at the polarizing angle :

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(a) reflected beam is polarized 100 per cent

(b) reflected and refracted beams are partially polarized

(c) the reason for (a) is that almost all the light is reflacted

(d) all of the above

60. Selected the right option in the following :

(a) Christian Huygens,a contemporary of Newton established the wave theory of light by assuming that light waves were transverse

(b) Maxwell provided the theoretical evidence evidence that light is transverse wave

(c) Thomas Young experimentally proved the wave behavior of light and Huygens assumption

(d) All the statements given above,correctly answer the question “what is light?”

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